



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,943	04/02/2004	Long-Hui Lin	LKSP0028USA	2942

27765 7590 11/15/2006

NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION  
P.O. BOX 506  
MERRIFIELD, VA 22116

EXAMINER
----------

GUTIERREZ, ANTHONY

ART UNIT	PAPER NUMBER
----------	--------------

2857

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

A

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/708,943	LIN, LONG-HUI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Anthony Gutierrez	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1-9 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

A process is statutory if it requires physical acts to be performed outside the computer independent of and following the steps to be performed by a programmed computer, where those acts involve the manipulation of tangible physical objects and result in the object having a different physical attribute or structure (see MPEP 2106).

A claim is limited to a practical application when the method, as claimed, produces a concrete, tangible and useful result; i.e., the method recites a step or act of producing something that is concrete, tangible and useful. Referring to the "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" in determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete."

(<http://www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm>)

The claimed methods perform processes for analyzing or judging a root cause for determining the semiconductor process causing the defect. A root cause and process are determined, but not subsequently output or used in any manner. No information is presented to a user nor does a physical transformation occur outside the computer as a result. The claims do not produce a **tangible** result and therefore are directed to non-statutory subject matter.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, and 6-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Nozoe et al. (United States Patent: US 6,777,677 B2).

As to claims 1, 2, 6, 7, and 9, Nozoe et al. discloses a method of defect root cause analysis (col. 4, lines 12-34) comprising following steps: providing a sample being processed through a plurality of semiconductor processes wherein the sample comprises a plurality of defects (col. 4, lines 35-47); performing a voltage contrast to identify locations of the defects (col. 4, lines 59-62); cutting the sample with a focus ion beam (FIB) to expose a cross-section of the sample (col. 9, line 67-col. 10, line 2);

Art Unit: 2857

utilizing auger electrons to perform a chemical state analysis of the cross-section of the sample (col. 10, lines 3 and 4); performing a mapping analysis according to a result of the chemical state analysis and judging a root cause of the defect generation according to a result of the mapping analysis (col. 10, lines 5-33, and col. 12, lines 31-51).

Nozoe et al. discloses forming the defects into a defect pattern (col. 18, lines 40-51 and Figs. 7A and 7B with respect to the review sequence) and comparing the defect pattern with a predetermined pattern on the sample for the root cause analysis for determining the semiconductor process causing the defect (col. 10, lines 51-60, col. 13, lines 45-55, col. 15, lines 34-41 and col. 3, lines 9-15).

As to claim 8, Nozoe et al. discloses that the method utilizes an auger electron spectroscopy (AES) to perform a chemical state analysis of the cross-section of the sample (col. 10, line 4).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nozoe et al. (United States Patent: US 6,777,677 B2), in view of Moore et al. (United States Patent: US 6,777,674 B2).

Nozoe et al. discloses the use of auger analysis for detecting defects in a semiconductor wafer as address above.

Nozoe et al. does not specifically disclose that the auger analysis is performed in when the defects are not single phase particles.

Moore et al. however discloses that Auger analysis can be employed to provide phase information on chemical bonding of elements. This implies that the particles are not single-phase particles, since the analysis is needed to determine the phase information. Moore et al. further teaches that this analysis is advantageous for small diameter particles with respect to surface sample analysis (col. 2, lines 46-59).

It therefore would have been obvious to one of ordinary skill in the art at the time of invention to use Auger analysis, as disclosed by Nozoe et al., for non-single phase defects, as taught by Moore et al., to advantageously determine chemical bonding information related to small particle defects on the surface of the wafer, in order to more accurately determine the effect that a small particle has on the relationship of the bonding of wafer surface elements, thereby facilitating removal of the particle without damaging the wafer.

Nozoe et al. does not specifically disclose that an energy dispersive spectrometer (EDS) is utilized when the defects are thick particles.

Moore et al. however discloses an interchangeability between Auger and EDS techniques (col. 3, lines 23-43), and further teaches that EDS is beneficial for application

with respect to relatively heavier particles than those for which Auger analysis would be beneficially (col. 2, lines 65-67).

It therefore would have been obvious to one of ordinary skill in the art at the time of invention to employ EDS techniques in place of Auger techniques, for thick particles, in order to facilitate the removal of a heavier particle, without risking background contamination that are common in Auger techniques, as taught by Moore et al. (col. 3, lines 1-16).

### ***Response to Arguments***

7. Applicant's arguments filed 8/29/06 have been fully considered but they are not persuasive.

With respect to the rejections under 35 U.S.C. 101, the Examiner recognizes the intention of the amendment to set forth a context by which the result is concrete, tangible, and useful.

The Examiner maintains that while the context may provide for a result that is useful and concrete, **tangible** application is still absent from the claims.

The determination of a cause or a process that can lead to a semiconductor defect is not considered to be tangible unless the determination is provided to a user (i.e. a display) or is output (i.e. to a device).

The Examiner is persuaded by Applicants arguments regarding the rejection under 35 U.S.C. 112, and has withdrawn the rejection.

The Examiner is not persuaded to Applicant's arguments regarding the rejections under the prior art. Applicant argues that the pattern of Nozoe et al. in Figs. 7A and B are regarding multiple dies, whereas the claimed invention are with respect to a single die.

The Examiner notes that this limitation is absent from the claims.

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The Examiner maintains that notwithstanding any differences in inventions as specified, the reference to Nozoe et al. anticipates or makes obvious all of Applicant's claims with respect to the specific language of the pending claims.

### **Conclusion**

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

#### United States Patents

US 7,123,356 B1 to Stokowski et al., teaches methods for inspecting reticles using aerial imaging and die to database detection.

US 7,092,826 B2, to Steele et al., teaches semiconductor wafer inspection using a non-vibrating contact potential.

US 7,069,155 B1 to Phan et al., teaches a real time analytical monitor for soft defects on a reticle.

US 7,065,238 B2 to Onoyama et al., teaches defect inspection using a differential signal from a pixel signal.

US 6,673,657 B2 and 6,605,478 B2 to Pnueli et al., teaches kill index analysis for automatic defect classification of semiconductor wafers.

5,787,190 to Peng et al., teaches pattern recognition of wafer test bins with respect to root cause.

United States Patent Application Publication

US 2004/0091142 A1 to Peterson et al., teaches the use of comparing aerial images in the fabrication of microlithographic patterns

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

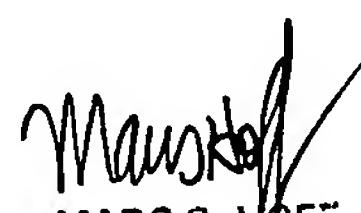
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Gutierrez whose telephone number is (571) 272-2215. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc Hoff can be reached on (571) 272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Anthony Gutierrez

11/9/06

  
MARC S. HOFF  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2850